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May 26, 2004

MAY 26 2004

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street SW
Washington DC 20554

**Re: Amendment of Part 101 of the Commission's Rules to Increase Spectrum Use
Through More Flexible Antenna Rules for the 10.7-11.7 GHz Band**


Dear Ms. Dortch:

On behalf of FiberTower, Inc. and pursuant to Section 1.401 of the Commission's Rules, I enclose for filing with the Commission the original and four copies of the above-referenced Petition for Rulemaking.

Kindly date-stamp and return the extra copy of this cover letter.

If there are any questions about this filing, please call me at the number above.

Respectfully submitted,


Mitchell Lazarus
Counsel for FiberTower, Inc.

ML:deb

Enclosures

cc: Service list

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Before the
Federal Communications Commission
Washington DC 20554

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MAY 26 2004

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of

Amendment of Part 101 of the
Commission's Rules to Increase Spectrum
Use Through More Flexible Antenna Rules
for the 10.7-11.7 GHz Band

RM- _____

PETITION FOR RULEMAKING

May 26, 2004

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Before the
Federal Communications Commission
Washington DC 20554

In the Matter of

Amendment of Part 101 of the
Commission's Rules to Increase Spectrum
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for the 10.7-11.7 GHz Band

RM- _____

PETITION FOR RULEMAKING

FiberTower, Inc. files this Petition for Rulemaking pursuant to Section 1.401 of the Commission's Rules.

FiberTower focuses on the backhaul portion of wireless networks. The FiberTower solution is a cost effective, high capacity, shared infrastructure consisting of existing fiber rings supplemented with high capacity point-to-point microwave solutions.

Adoption of the rules requested here will enable FiberTower and other operators to serve customers at lower cost and with more flexible deployments. Those advantages will ultimately increase competition and reduce prices for the end users of wireless network services.

A. Summary

FiberTower asks the Commission to amend Sections 101.113 and 101.115 of its rules, as detailed below, to permit the use of two-foot Fixed Service Category A and Category B antennas in the 10.7-11.7 GHz (11 GHz) band as an optional alternative to the four-foot antennas presently required.¹

¹ The Commission recently permitted two-foot antennas in the 10.55-10.68 GHz band. See 47 C.F.R. Sec. 101.115(b), *amended by Processing of Microwave Applications in the Wireless Telecommunications Services*, 17 FCC Rcd 15040 (2002).

Smaller antennas will reduce the costs of providing, installing, and maintaining equipment for an 11 GHz Fixed Service link. They will allow links to be installed at locations not available to large antennas. Lower costs and new deployment options will reduce end user costs for a broad range of services including wireless local loop and T-1 transport, broadband Internet access for schools, businesses, and apartment buildings, and interconnection of industrial campuses for LANs and PBXs. Smaller, less expensive antennas will create new competition with fiber and other modes of broadband delivery, reducing costs for all users.

Lower costs and easier installation at 11 GHz will make it easier to accommodate Fixed Service users displaced by reallocations of Fixed Service spectrum to other uses, most recently the reallocation of large 18 GHz band segments to satellite operations.² The requested rules will also help Fixed Service licensees who are unable to expand in the 4 GHz and 6 GHz bands, where permissive earth station coordination rules make it difficult to coordinate new Fixed Service links in populated areas. In all, more efficient use of the 11 GHz band will directly serve the Commission's spectrum policy goals.

The sole drawback of a smaller antenna is its less tightly focused beam, compared to a large antenna. A smaller antenna generally has a wider main lobe and bigger sidelobes relative to the main lobe. This can affect coexistence with other users of the band, both Fixed Service licensees and satellite earth stations.³ On the favorable side, a small antenna has a shorter range,

² *Redesignation of the 17.7-19.7 GHz Frequency Band*, 17 FCC Rcd 24248 (2002); (redesignating 18.3-18.58 GHz); *Redesignation of the 17.7-19.7 GHz Frequency Band*, 15 FCC Rcd 13430 (2000).

³ The 11 GHz includes a limited number of international downlink earth stations and proposed gateway earth stations for non-geosynchronous satellite systems. 47 C.F.R. Sec. 25.202(a)(1) & nn. 2, 12.

other things being equal, and so is less likely to cause interference to other facilities located close to its axis. But the broader pattern can also have two potentially adverse effects. First, depending on the geometry, in some cases a small transmitting antenna may be more likely to cause interference to an 11 GHz Fixed Service receiver or satellite earth station located off the antenna axis. Second, a small antenna may be more susceptible to received interference originating from a source removed from the antenna axis.

Left unaddressed, these latter contingencies could be detrimental to other Fixed Service operators and to earth stations. We therefore propose a minor change to the rules that will place any burden arising from a small antenna on the party using it. The deployment of small antennas will be transparent to others sharing the spectrum. The rules proposed here deliver all of the cost and flexibility benefits of small antennas with no detriment to other users of the band.

B. Discussion

FiberTower asks the Commission to give Fixed Service licensees in the 10.7-11.7 GHz band a choice between two sets of antenna standards: the present standards set out in Section 101.115(b), which presuppose antennas four feet in diameter, and alternative standards based on a two-foot antenna. Table 1 in the Appendix sets out the requested alternative. Table 2 compares it with the present standard.

1. Benefits of the proposal

In 2002, the Commission adopted the same standard we request here at 10.55-10.68 GHz (10 GHz band).⁴ The Commission explained that decision in part by noting that smaller antennas promote increased usage of the band at issue, and pointed to the "undeniable" benefits

⁴ *Processing of Microwave Applications in the Wireless Telecommunications Services*, 17 FCC Rcd 15040 (2002).

of esthetics and structure loading.⁵ But the 10 GHz authorization delivers only some of the needed benefits. The entire band is only 130 MHz wide, and maximum authorized channel width is only 5 MHz, which severely limits data rates.⁶ Systems at 10 GHz requiring increased capacity must go elsewhere. A transition to nearby spectrum at 10.7-11.7 GHz will often be relatively easy, inexpensive, and fast.

The proposal for small antennas at 11 GHz will yield three kinds of benefits, arising from their lower cost, smaller size, and capability for making better use of spectrum.

COST. Small antennas cost less to manufacture and distribute. Because they weigh less, they need less structural support, and so are less expensive to install. Once in place, they are less subject to wind load and other destructive forces, and cost less to maintain.

The list price for a two-foot antenna is only 1/3 that of an otherwise comparable four-foot antenna. This cost difference alone will put microwave communications within reach of users for whom they are presently inaccessible. Lower cost will also prompt new competition over a broad range of services, including wireless local loop and T-1 transport; broadband Internet access for schools, businesses (including small businesses), and apartment buildings; and interconnection of industrial campuses for LAN, PBX, and the like. By forcing other providers of these services to lower their prices and improve quality, competition will ultimately benefit all end users, regardless of the technology they use.

SIZE. Smaller antennas are lighter and less conspicuous than large ones. A two-foot antenna has 1/4 the dish area of a four-foot antenna, resulting in a major reduction in overall

⁵ *Id.* at para. 77.

⁶ 47 C.F.R. Sec. 101.147(m).

weight: less than 35 pounds for the two-foot antenna, compared to more than 125 pounds for the four-foot size. The modest weight of small antennas makes them practical for installation at sites incapable of supporting large dishes, including many rooftops, electrical transmission towers, water towers, and monopoles and other radio towers. This flexibility permits inexpensive last-mile delivery of broadband service to locations that are otherwise expensive or impossible to reach with broadband radio. Once in place, moreover, small antennas raise fewer esthetic objections. For that reason they permit easier compliance with local zoning and homeowner association codes. Communities that might understandably protest a massive four-foot dish near residences or in light industrial areas may find the two-foot counterpart unobjectionable.

SPECTRUM. Society benefits from efficient use of its resources. With vacant spectrum becoming scarce and congestion mounting in many bands, it makes little sense to maintain rigid antenna rules that hinder licensees from extracting the maximum value from the spectrum available.

The Fixed Service has a special need for flexibility in how it uses spectrum. The last several years have seen large blocks of its frequencies reallocated to other uses, primarily wireless telephone and satellite. New spectrum available to the Fixed Service is so high in frequency as to be suitable only for short-range applications.⁷ Thus, the need to relocate users from spectrum reassigned to other services has put great pressure on the remaining Fixed Service bands capable of handling reasonably long links -- the 4, 6, 11, and 23 GHz bands, and the

⁷ E.g., *Allocations and Service Rules for the 71-76 GHz, 81-86 GHz and 92-95 GHz Bands*, 18 FCC Rcd 23318 (2003). Free-space attenuation of a microwave signal increases with frequency, limiting the useful range of high-frequency signals of a given power.

remaining Fixed Service allocation at 18 GHz. But those too have serious limitations. Earth stations in the 4 and 6 GHz bands are routinely coordinated and licensed for the entire band and satellite arc regardless of actual need, and thus block many Fixed Service coordination efforts, especially in populated areas. Federal Government installations in the 23 GHz band limit private use, and there is little 18 GHz spectrum left for the Fixed Service, following recent reallocations to satellite operations. For all of these reasons, the industry needs to make better use of the limited spectrum it still has.

Our proposal for increased flexibility at 11 GHz will help to even out the load in other bands and ease congestion across much of the Fixed Service.

2. *Needed precautions*

Small antennas are both easier and harder to coordinate than large ones. A small antenna projects energy over a shorter distance, and so near its axis it tends to cause and receive interference over a smaller range. On the other hand, the small antenna is more likely to cause and receive interference at angles off the axis. Notwithstanding this second characteristic, we seek to ensure that smaller antennas do not disadvantage either satellite earth stations or Fixed Service stations using large antennas.

The frequency coordination context presents four possible cases. Note that earth stations in this band are downlinks (space to Earth). They can receive interference, but cannot produce it.

1. *Applicant with a small antenna receives interference.* Small-antenna applicant *X* seeks to coordinate, and predicts it will receive more interference than if it used a large antenna.
2. *Applicant with a small antenna causes interference.* Small-antenna applicant *X* seeks to coordinate; a pre-existing earth station or Fixed

Service user with a large antenna predicts it will receive more interference than it would if *X* used a large antenna.

3. *Licensee with a small antenna receives interference.* A Fixed Service applicant with a large antenna seeks to coordinate; small-antenna existing licensee *X* predicts it will receive more interference than it would if it used a large antenna.
4. *Licensee with a small antenna causes interference.* An earth station or Fixed Service user with a large antenna seeks to coordinate, and predicts it will receive more interference from small-antenna existing licensee *X* than it would if *X* used a large antenna.

Cases 1 and 2 are adequately addressed under the present rules, and need no change. In Case 1, the small-antenna applicant can decide whether or not to construct and accept interference from the pre-existing licensee. In Case 2, the effort at frequency coordination is unsuccessful and the small-antenna applicant is not permitted to construct. In either of these cases, the applicant may have the option of re-trying the coordination with a more discriminative, large antenna.

Cases 3 and 4 cover the situations in which a large-antenna applicant is unable to coordinate successfully solely because an existing licensee is using a small antenna, where the coordination would succeed if the same licensee were using a large antenna.

In Case 3 (small-antenna licensee objects to coordination where large-antenna licensee would not have grounds), the small antenna user should have a choice between upgrading the small antenna to a large one, or keeping the small antenna and accepting the interference. In Case 4 (earth station or large-antenna Fixed Service applicant would receive interference from existing small-antenna licensee, but could coordinate successfully with large antenna), the small-antenna user should similarly should have a choice between upgrading the small antenna to a

large one, or turning down the power to the point where it causes no more interference than would a large antenna.

3. *Category A vs. Category B*

Outside certain congested areas, existing rules permit the use of either Category A antennas or the less stringent Category B antennas.⁸ Generally a Category B user must upgrade if the antenna causes interference problems that a Category A antenna would resolve. We suggest standards for two-foot antennas in both Categories A and B, and propose that the Commission leave the upgrade rules unchanged.

4. *Rule language*

To implement the proposals outlined above, we ask the Commission to amend Sections 101.103 and 101.115 as follows:

(a) The Commission should add the following paragraph (j) to Section 101.103 of its rules:

(j) *Coordination of small antennas in the 10.7-11.7 GHz band.*

(1) A licensee or prior applicant using an antenna smaller than 1.22 meters (4 feet) in diameter may object to a prior coordination notice (i) only if it has actual grounds to object because of predicted interference, and (ii) only to the extent it would have grounds to object if it were using a 1.22 meter antenna at the same site, polarization, frequency, bandwidth, and orientation.

(2) A Fixed Service applicant attempting to frequency coordinate an antenna of 1.22 meters in diameter or larger, and predicting received interference from a licensee or prior applicant using an antenna smaller than 1.22 meters in diameter, can require the licensee or prior applicant to reduce the predicted interference to levels no higher than would be predicted from an antenna of 1.22 meters in diameter.

⁸ 47 C.F.R. Sec. 101.115(c).

(b) The Commission should amend the table in Section 101.115(b) as shown in the Appendix hereto.

CONCLUSION

The authorization of two-foot antennas in the 10.7-11.7 GHz band will deliver advantages of cost, flexibility of installation, and spectrum efficiency. If accompanied by adoption of the proposed rule provisions, the change will not adversely affect other users of the band.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Mitchell Lazarus", is written over the printed name and firm name.

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May 26, 2004

APPENDIX

For insertion into Section 101.115(b) (table):

Frequency (MHz)	Category	Maximum beam-width to 3 dB points	Minimum antenna gain (dBi)	Minimum radiation suppression to angle in degrees from centerline of main beam in decibels						
				5 ° to 10°	10° to 15°	15° to 20°	20° to 30°	30° to 100°	100° to 140°	140° to 180°
10,700- 11,700 ^x	A	3.5	33.5	18	24	28	32	35	55	55
	B	3.5	33.5	17	24	28	32	35	40	45

^x Use of these antenna standards is subject to compliance with Section 101.103(j).

Table 1
Proposed Alternate Antenna Specifications for 10.7-11.7 GHz

	Category	Size	3 dB beam- width (degrees)	Minimum antenna gain (dBi)	Front/ back ratio (dB)	Minimum radiation suppression to angle in degrees from centerline of main beam in decibels						
						5 ° to 10°	10° to 15°	15° to 20°	20° to 30°	30° to 100°	100° to 140°	140° to 180°
Current	A	4 foot	2.2	38	55	25	29	33	36	42	55	55
	B		2.2	38	36	20	24	28	32	35	36	36
Proposed Alternate	A	2 foot	3.5	33.5	55	18	24	28	32	35	55	55
	B		3.5	33.5	45	17	24	28	32	35	40	45

Table 2
Comparison Between Present and Proposed Alternate Antenna Specifications for 10.7-11.7 GHz

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